

Remarks

This is in response to the Office Action mailed March 15, 2006, in the above-referenced application. Claims 1-5 and 7-18 are pending. Claims 6 and 19-44 have been withdrawn as being drawn to a non-elected invention. Applicants note with appreciation the indication that Claim 12 would be allowable if rewritten into independent form.

The Office argues that the figures do not illustrate the device as recited in Claims 11 and 12. Without prejudice or disclaimer, Applicant submits concurrently herewith one (1) sheet with new Figures 5 and 6, labeled as "NEW SHEET" in accordance with 37 CFR 1.121(a). Proposed Figure 5 illustrates an exemplary embodiment of the invention such as recited in Claim 11 and proposed Figure 6 illustrates an exemplary embodiment of the invention such as recited in Claim 12. Support for new Figures 5 and 6 can be found in the specification as filed, for example, at paragraphs [0049] and [0056] and claims 11 and 12. Accordingly, Applicant submits that new Figures 5 and 6 do not introduce new matter. Applicant respectfully requests entry of new Figures 5 and 6 and withdrawal of the objection to the figures in the present application.

Claims 7 and 10 are rejected under 35 USC Section 112, second paragraph, as indefinite. Claim 7 is amended to correct an apparent typographical error, namely, to change the dependency thereof from Claim 1 to Claim 2. Support for this amendment can be found at paragraph [0036] of the application as filed. Claim 10 is also amended to correct an apparent typographical error, namely, to correct the formula recited therein. Support for this amendment can be found at paragraph [0043] of the application filed. Applicant accordingly respectfully requests withdrawal of this rejection.

Claims 1, 3-5, 8 and 10 are rejected under 35 USC Section 103(a) as unpatentable over Touchy (U.S. Patent No. 3,925,121) in view of Ogihara et al. (U.S. Patent NO., 5,700,714, hereinafter Ogihara). Applicant respectfully traverses this rejection.

The Touchy and Ogihara devices differ significantly from one another with regard to device structure, composition of various layers present therein, and the requisite function of various device layers. The Touchy device includes a Group III-V monocrystal substrate, a

protective layer on the surface of the substrate, and, according to the Office, a diffusion source layer. In Touchy, the diffusion source material passes through the protective layer.

The Ogihara device includes a Group III-V substrate, an aluminum hydride mask with windows etched therein to expose portions of the surface of the substrate, and a diffusion source film on the aluminum hydride mask, wherein at least portion of the diffusion source film directly contacts the substrate via the windows in the mask. In contrast to Touchy, in Ogihara, the diffusion source material diffuses directly into the substrate without passing through an intermediate layer. Indeed, Ogihara requires “windows” in the aluminum hydride mask because aluminum hydride is stated therein to prevent the diffusion of the source material. Column 3, lines 38-50. Accordingly, there is no motivation or suggestion to combine the teachings of these patents.

Even if one of ordinary skill in the art were to combine the teachings of the cited patents (which Applicant submits there is no suggestion or motivation to do), the resultant device would not be the same as claimed. Ogihara requires the capping layer to be formed of a material, such as aluminum hydride, that has the property of blocking the passage of an impurity (zinc). Column 3, lines 38-39. In contrast, Touchy includes silicon dioxide as a material through which zinc will pass. Thus, when the cited references are considered in their entirety for all that they properly teach, the skilled artisan would not make the combination suggested by the Examiner. At best, the resultant combination would incorporate a capping layer of aluminum hydride, which Ogihara states has the requisite property to block the passage of zinc. Column 3, lines 48-49.

Touchy and Ogihara are directed to structurally distinguishable devices including layers formed of different compositions having different functions. Accordingly, there is no motivation or suggestion to modify Touchy as suggested by the Office, absent an improper hindsight analysis relying upon the Applicant’s own teachings. Even if one were to combine the teachings of the cited patents (which Applicant disputes there is any such motivation), the result would still not be the same as claimed. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Claims 2, 9, 11 and 13 are rejected under 35 USC Section 103(a) as obvious over Touchy in view of Ogihara and further in view of Edmond et al. (U.S. Patent No. 5,523,589, hereinafter Edmond; Claim 2); Iguchi et al. (U.S. Patent No. 6,214,708, hereinafter Iguchi; Claim 9); and Nobori et al. (U.S. Patent No. 6,291,328, hereinafter Nobori; Claims 11 and 13). Applicant respectfully traverses these rejections for the reasons given above with regard to the rejection of Claims 1, 3-5, 8 and 10 in view of Touchy and Ogihara.

In addition, with regard to Claim 2, Applicant submits that Edmond cannot overcome the additional deficiencies of Touchy and Ogihara. The Touchy device is produced by doping a surface of a Group III-V semiconductor monocrystal. Column 1, lines 48-49. Edmond addresses the problem of crystal lattice matching in the production of GaN LEDs. Because Touchy dopes the surface of a Group III-V crystal to form its device, crystal lattice mismatch is not a problem. Accordingly, there is no motivation to make the modification suggested by the Examiner. Indeed, Touchy does not identify or recognize any problems associated with its substrate, much less suggest modifying its substrate to include a more complex silicon carbide substrate/buffer layer/n-type Group III nitride layer structure. Accordingly, Applicant submits that Claim 2 is patentable over the cited patents and respectfully requests withdrawal of this rejection.

With regard to Claims 11 and 13, Applicant submits that Nobori cannot overcome the additional deficiencies of Touchy and Ogihara. The Touchy process necessarily results in the production of continuous layers resulting from exposing the substrate to a gaseous form of the dopant or by a "paint-on" or "spin-on" process. Touchy does not suggest any modification to its process to provide a device having a plurality of silicon dioxide portions with a respective portion of a source composition one each silicon dioxide portion, and there is no motivation to modify the process to provide the same.

The Office also refers to the "diffusion cap layer" 14 of Nobori. Yet, Nobori does not teach or suggest silicon dioxide as a suitable material for the capping layer. Further, similar to Ogihara, Nobori states that the capping layer "prevents the escape of impurity atoms." Column 3, lines 35-36. In contrast, Touchy includes silicon dioxide as a material through

which zinc will pass. Thus, when the cited references are considered in their entirety for all that they properly teach, the skilled artisan would not make the combination suggested by the Office.

The Nobori device also includes an ohmic contact layer 11 (for example formed of gallium arsenide) between a surface of the substrate 10 and the diffusion source 12. This further highlights the structural and functional differences between the devices (and their respective components) of the cited patents, thereby obviating any suggestion or motivation to combine the teachings thereof. To conclude otherwise requires one to "pick and choose" among disparate portions of the cited references without any suggestion to do so, absent an improper hindsight analysis of the Applicant's own specification.

Accordingly, Applicant submits that Claims 2, 9, 11 and 13 are patentable over the cited patents and respectfully requests withdrawal of these rejections.

Claims 1, 2, 7 and 14-18 are rejected under 35 USC Section 103(a) as being unpatentable over Omi et al. (U.S. Patent No. 6,549,552, hereinafter Omi) in view of Touchy and Ogihara. Applicant respectfully traverses this rejection as well.

Omi does not teach or suggest a diffusion doping process. Rather, in Omi, various layers are already doped prior to application to the substrate, and the resultant device is heated to activate the dopant. Column 5, lines 17-23. Accordingly, there is no motivation to add a diffusion layer, inasmuch as the various layers as applied to the Omi device already include dopant materials. Further, Omi certainly does not teach or suggest the addition of yet another layer, namely, a silicon dioxide layer, underlying a diffusion layer.

In addition, Omi differs in other respects from Touchy that further emphasize the different structures and approaches taken by the cited patents. The Omi device generates light via a non-doped active layer 14, not via a p-n junction. The doped layer 9 referenced in the rejection is stated to be a contact layer, not a light generating layer. Indeed, the Omi device further includes a light absorption layer 17 to absorb light seeping into a cladding layer 5 to remove errors that can result from light leakage from the device. These further highlight the various structural and functional differences between the devices (and their respective

components) of the cited patents, thereby obviating any suggestion or motivation to combine the teachings thereof. To conclude otherwise requires one to “pick and choose” among disparate portions of the cited references without any suggestion to do so, absent an improper hindsight analysis of the Applicant’s own specification.

Applicant further submits that Ogihara cannot overcome the deficiencies of Omi and Touchy for the reasons discussed in more detail above.

Accordingly, Applicant submits that Claims 1, 2, 7, and 14-18 are patentable over the cited patents and respectfully requests withdrawal of these rejections as well.

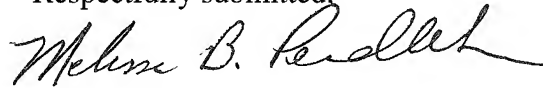
The rejections of record having been addressed in full in the foregoing, Applicant respectfully submits that the present application is in condition for allowance, which action is respectfully solicited. Should the Examiner have any questions regarding the foregoing, it is respectfully requested that the Examiner contact the undersigned at his convenience to expedite examination and allowance of this matter.

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee

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required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 50-0332.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Melissa B. Pendleton". The signature is fluid and cursive, with a long horizontal stroke at the end.

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